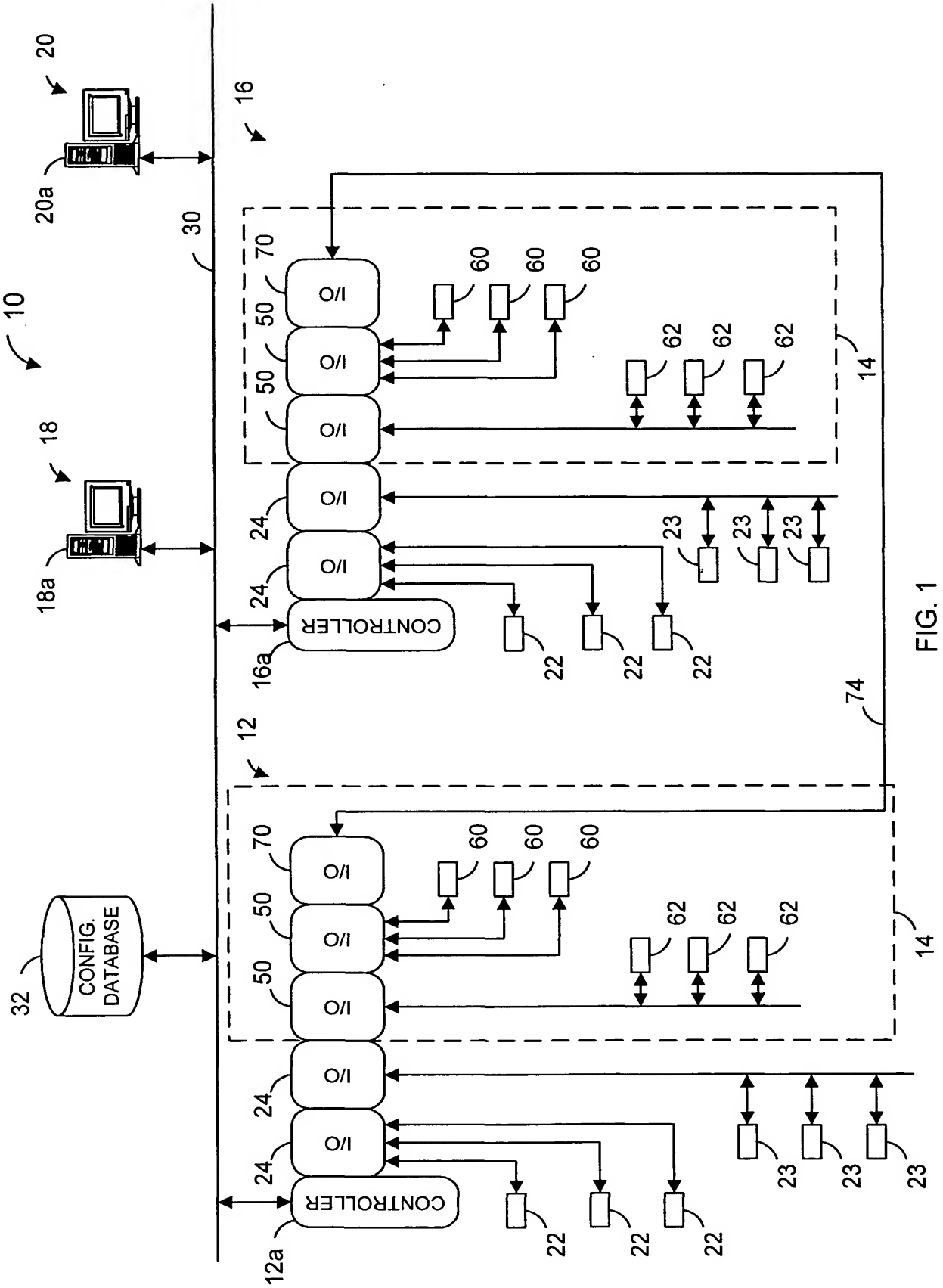
20
20a
16
30
10
18
18a
70
50
50
50
O/I
60
62
14
24
23
22
CONTROLLER
16a
74
12
12a
CONFIG. DATABASE
32

FIG. 1

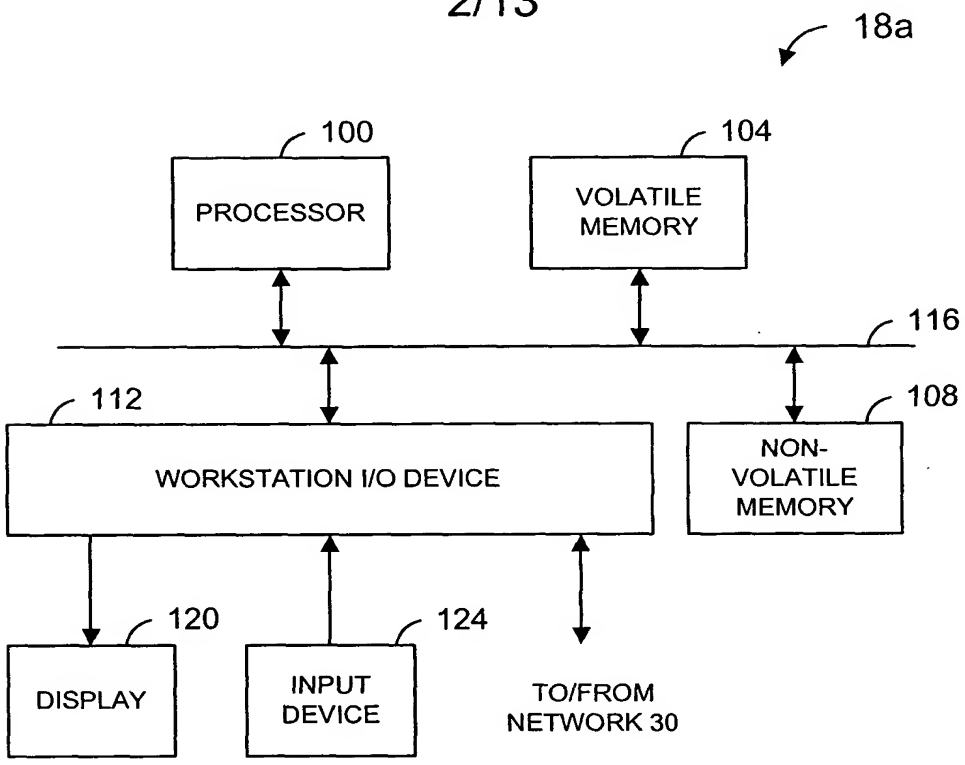
18a
100
PROCESSOR
104
VOLATILE MEMORY
116
112
WORKSTATION I/O DEVICE
108
NON-VOLATILE MEMORY
120
DISPLAY
124
INPUT DEVICE
TO/FROM NETWORK 30

FIG. 2

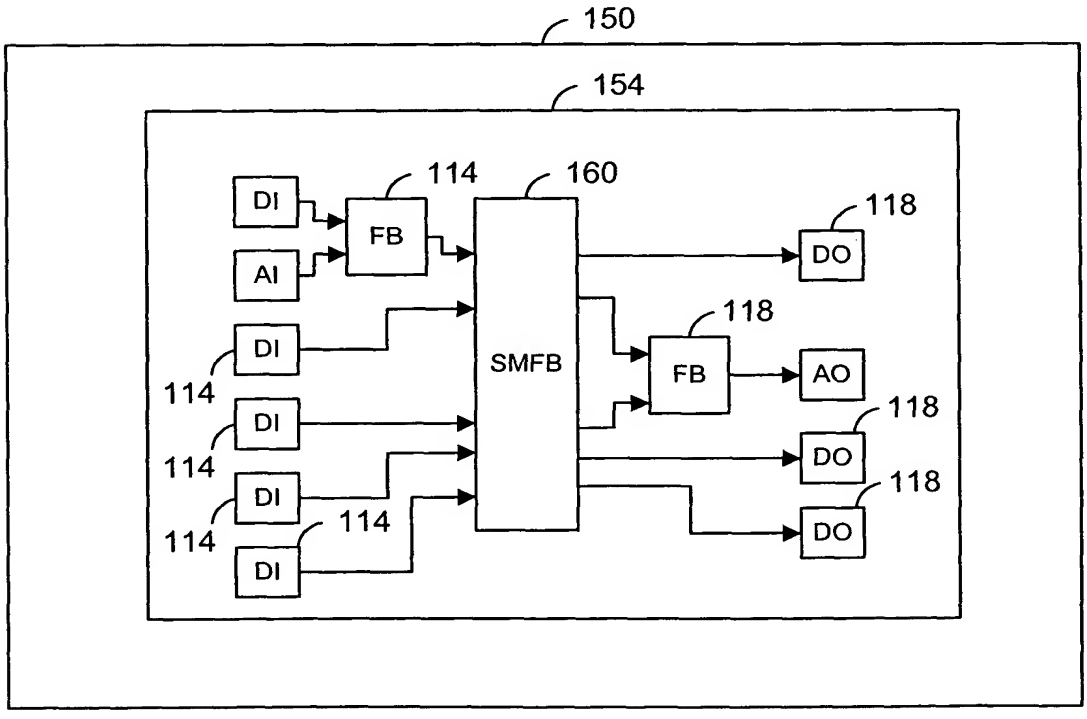
150
154
114
160
DI
AI
FB
SMFB
118
DO
FB
AO
DO
DO
DI
DI
DI
DI

FIG. 3

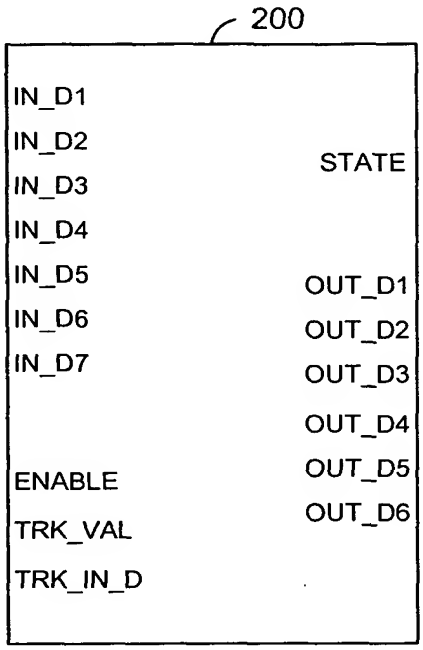
200
IN_D1
IN_D2
IN_D3
IN_D4
IN_D5
IN_D6
IN_D7
ENABLE
TRK_VAL
TRK_IN_D
STATE
OUT_D1
OUT_D2
OUT_D3
OUT_D4
OUT_D5
OUT_D6

FIG. 4

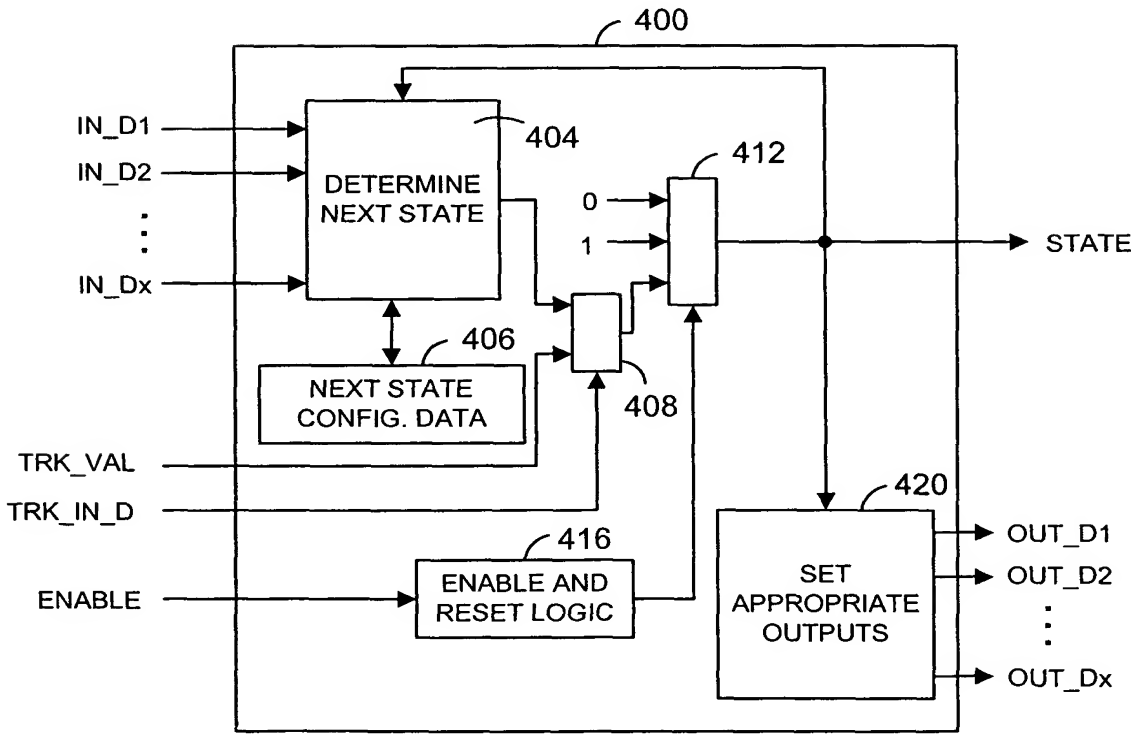
400
IN_D1
IN_D2
IN_Dx
DETERMINE NEXT STATE
404
412
0
1
STATE
406
NEXT STATE CONFIG. DATA
408
TRK_VAL
TRK_IN_D
420
416
ENABLE
ENABLE AND RESET LOGIC
SET APPROPRIATE OUTPUTS
OUT_D1
OUT_D2
OUT_Dx

FIG. 8

300

STATES / INPUTS	1 - TRIPPED	2 - WAITING FOR RESET	3 - READY FOR RESET	4 - WAITING FOR START	5 - NORMAL OPERATION	6 - RECOVERED
1 - INITIAL						
2 - RESET PERMIT						
3- RESET						
4 - START PERMIT						
5 - NORMAL						
6- TRIP REQUESTED						
7 - START RECOVER						

304

FIG. 5

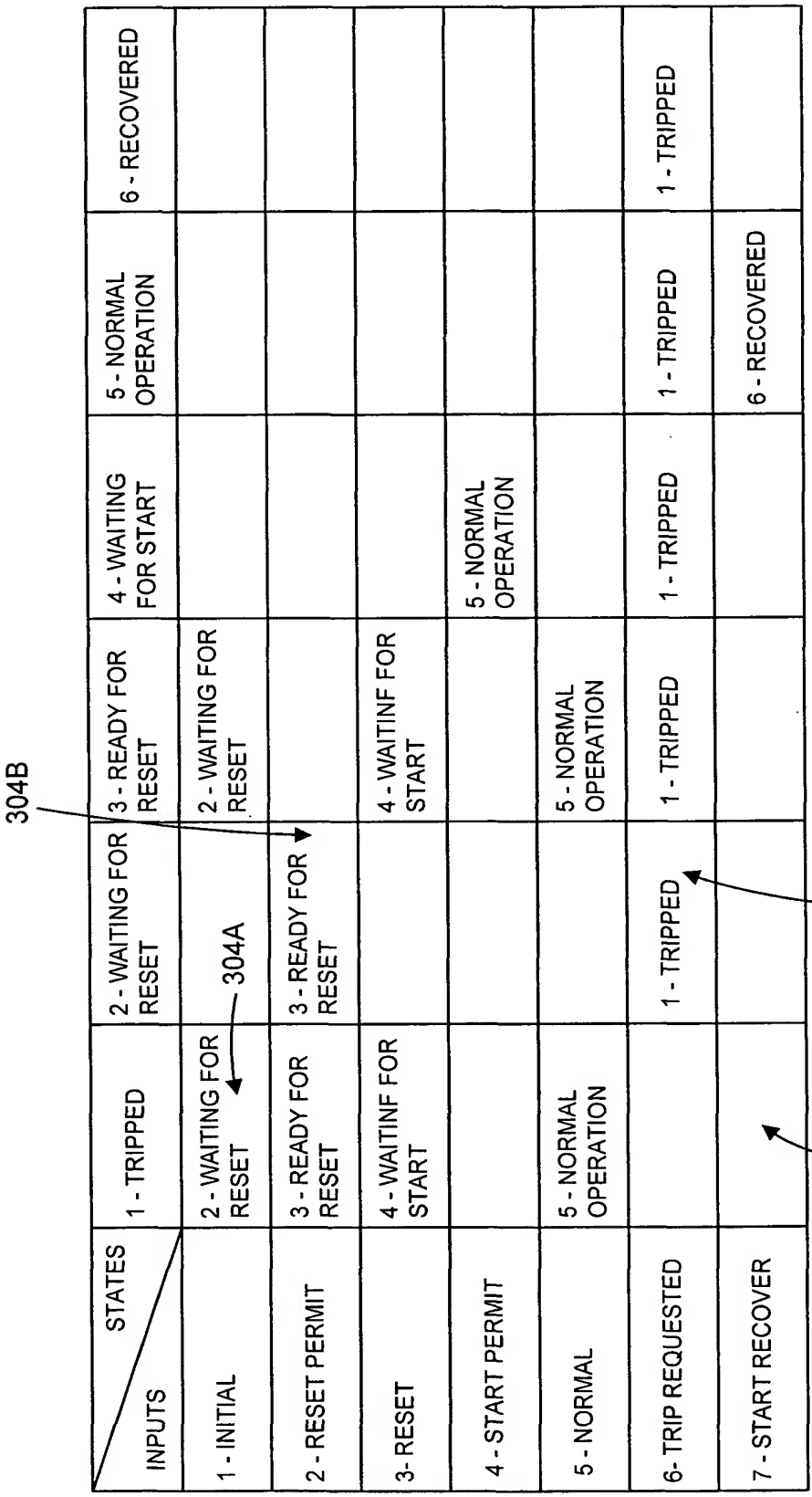
300
304B
304A
304C
304D
STATES
INPUTS
1 - TRIPPED
2 - WAITING FOR RESET
3 - READY FOR RESET
4 - WAITING FOR START
5 - NORMAL OPERATION
6 - RECOVERED
1 - INITIAL
2 - RESET PERMIT
3- RESET
4 - START PERMIT
5 - NORMAL
6- TRIP REQUESTED
7 - START RECOVER

FIG. 6

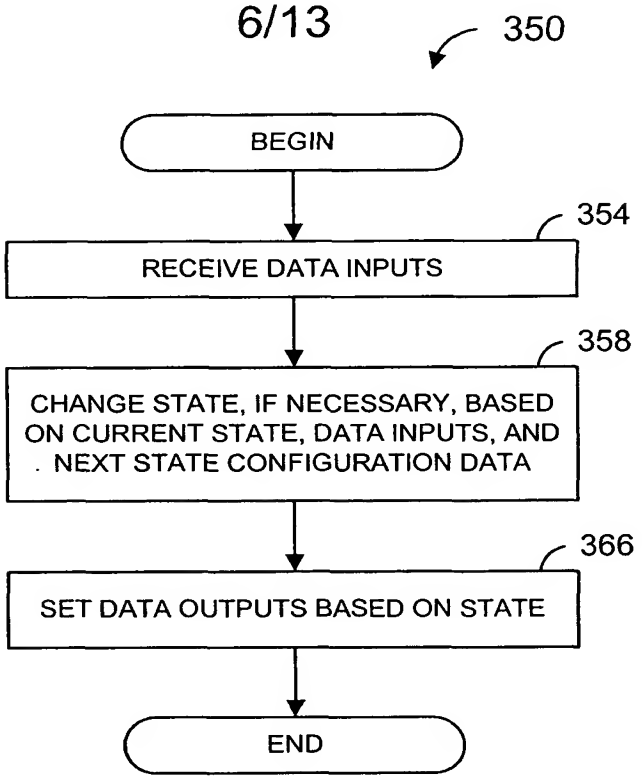
350
BEGIN
354
RECEIVE DATA INPUTS
358
CHANGE STATE, IF NECESSARY, BASED ON CURRENT STATE, DATA INPUTS, AND NEXT STATE CONFIGURATION DATA
366
SET DATA OUTPUTS BASED ON STATE
END

FIG. 7

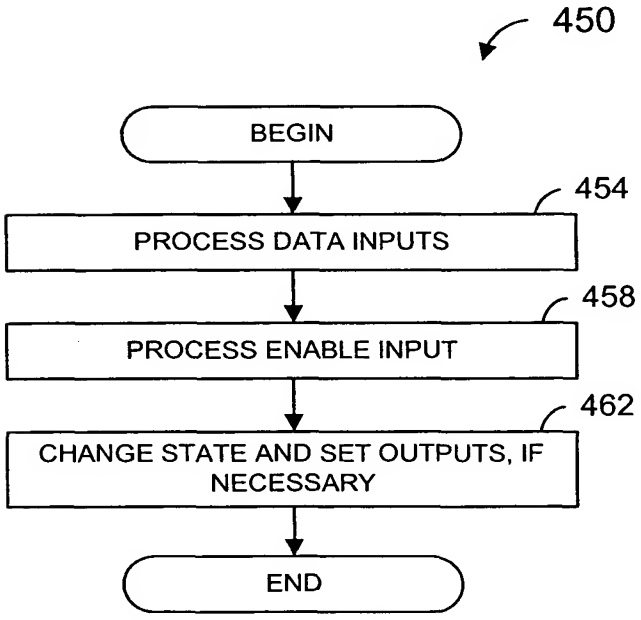
450
BEGIN
454
PROCESS DATA INPUTS
458
PROCESS ENABLE INPUT
462
CHANGE STATE AND SET OUTPUTS, IF NECESSARY
END

FIG. 9

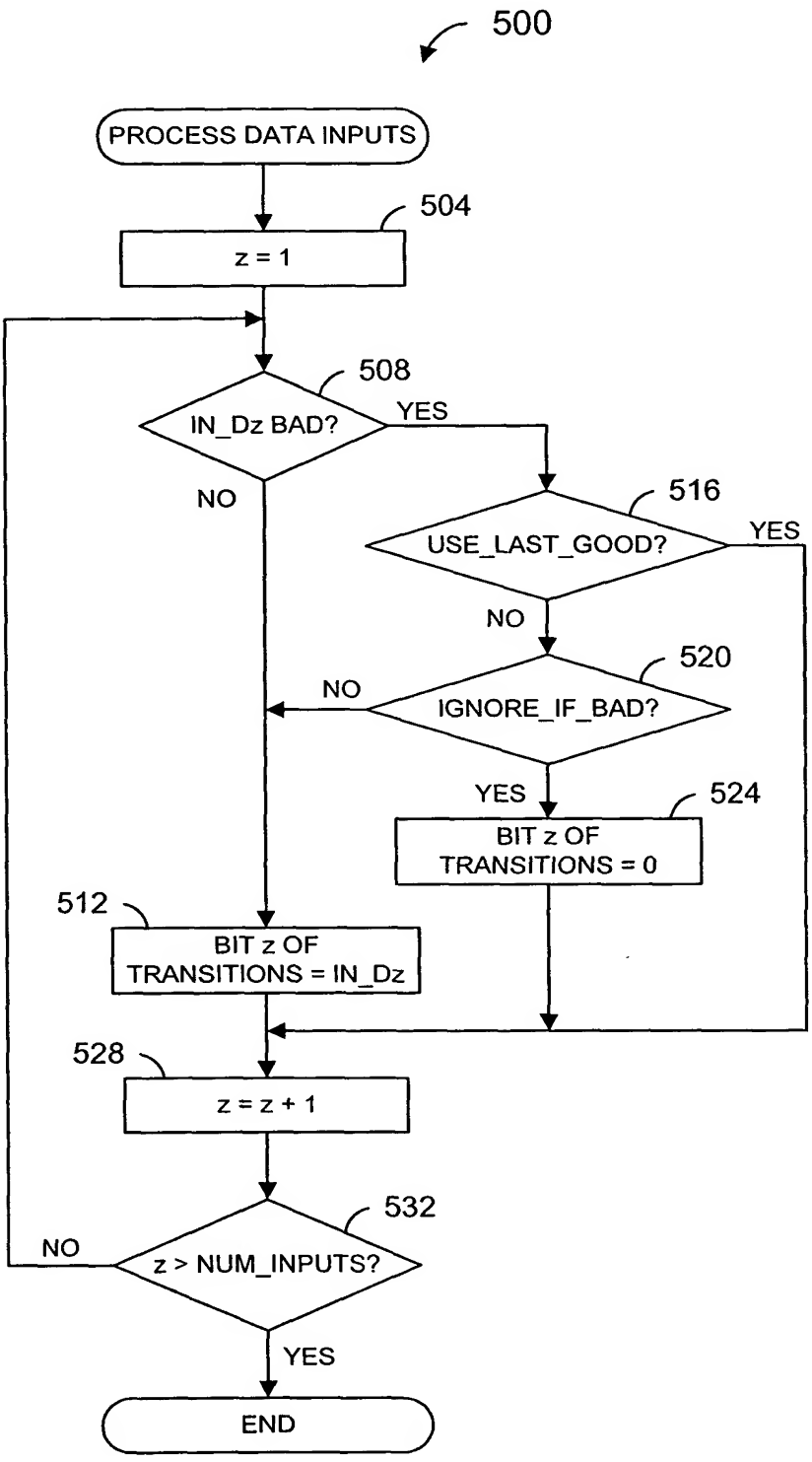
500
PROCESS DATA INPUTS
504
z = 1
508
IN_Dz BAD?
YES
NO
516
USE_LAST_GOOD?
YES
NO
520
IGNORE_IF_BAD?
NO
YES
524
BIT z OF TRANSITIONS = 0
512
BIT z OF TRANSITIONS = IN_Dz
528
z = z + 1
532
z > NUM_INPUTS?
NO
YES
END

FIG. 10

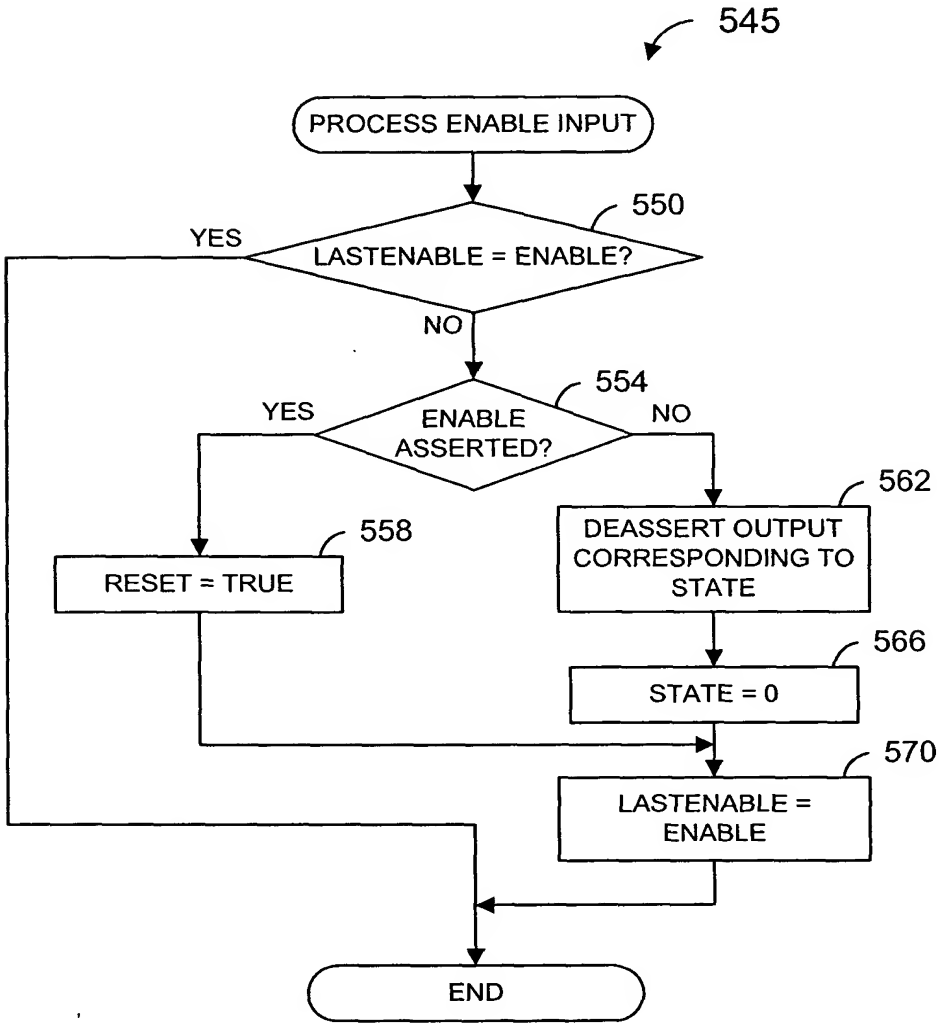
545
PROCESS ENABLE INPUT
550
LASTENABLE = ENABLE?
YES
NO
554
ENABLE ASSERTED?
YES
NO
558
RESET = TRUE
562
DEASSERT OUTPUT CORRESPONDING TO STATE
566
STATE = 0
570
LASTENABLE = ENABLE
END

FIG. 11

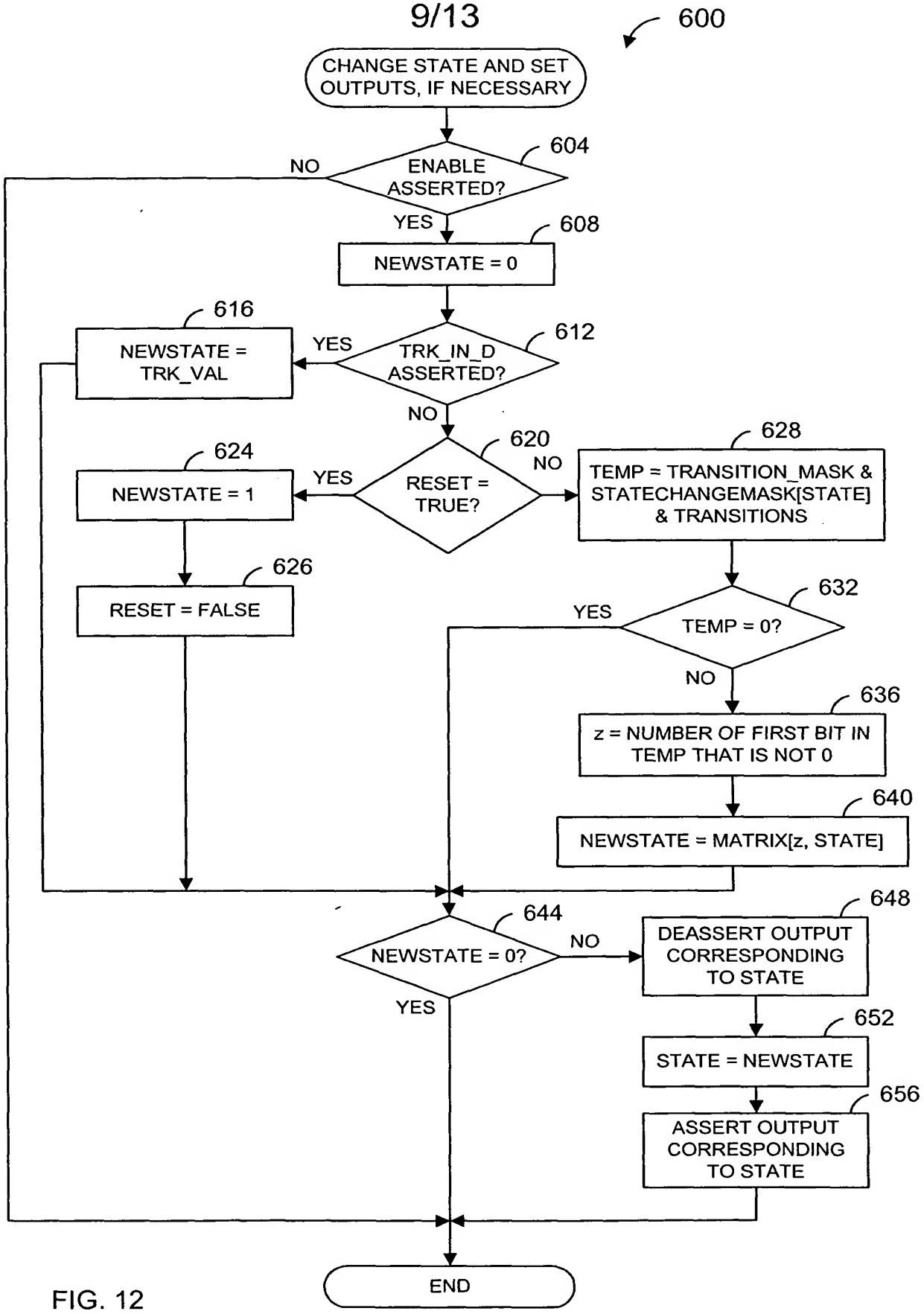
600
CHANGE STATE AND SET OUTPUTS, IF NECESSARY
604
ENABLE ASSERTED?
NO
YES
608
NEWSTATE = 0
616
NEWSTATE = TRK_VAL
YES
612
TRK_IN_D ASSERTED?
NO
624
NEWSTATE = 1
YES
620
RESET = TRUE?
NO
628
TEMP = TRANSITION_MASK & STATECHANGEMASK[STATE] & TRANSITIONS
626
RESET = FALSE
632
TEMP = 0?
YES
NO
636
z = NUMBER OF FIRST BIT IN TEMP THAT IS NOT 0
640
NEWSTATE = MATRIX[z, STATE]
644
NEWSTATE = 0?
NO
YES
648
DEASSERT OUTPUT CORRESPONDING TO STATE
652
STATE = NEWSTATE
656
ASSERT OUTPUT CORRESPONDING TO STATE
END

FIG. 12

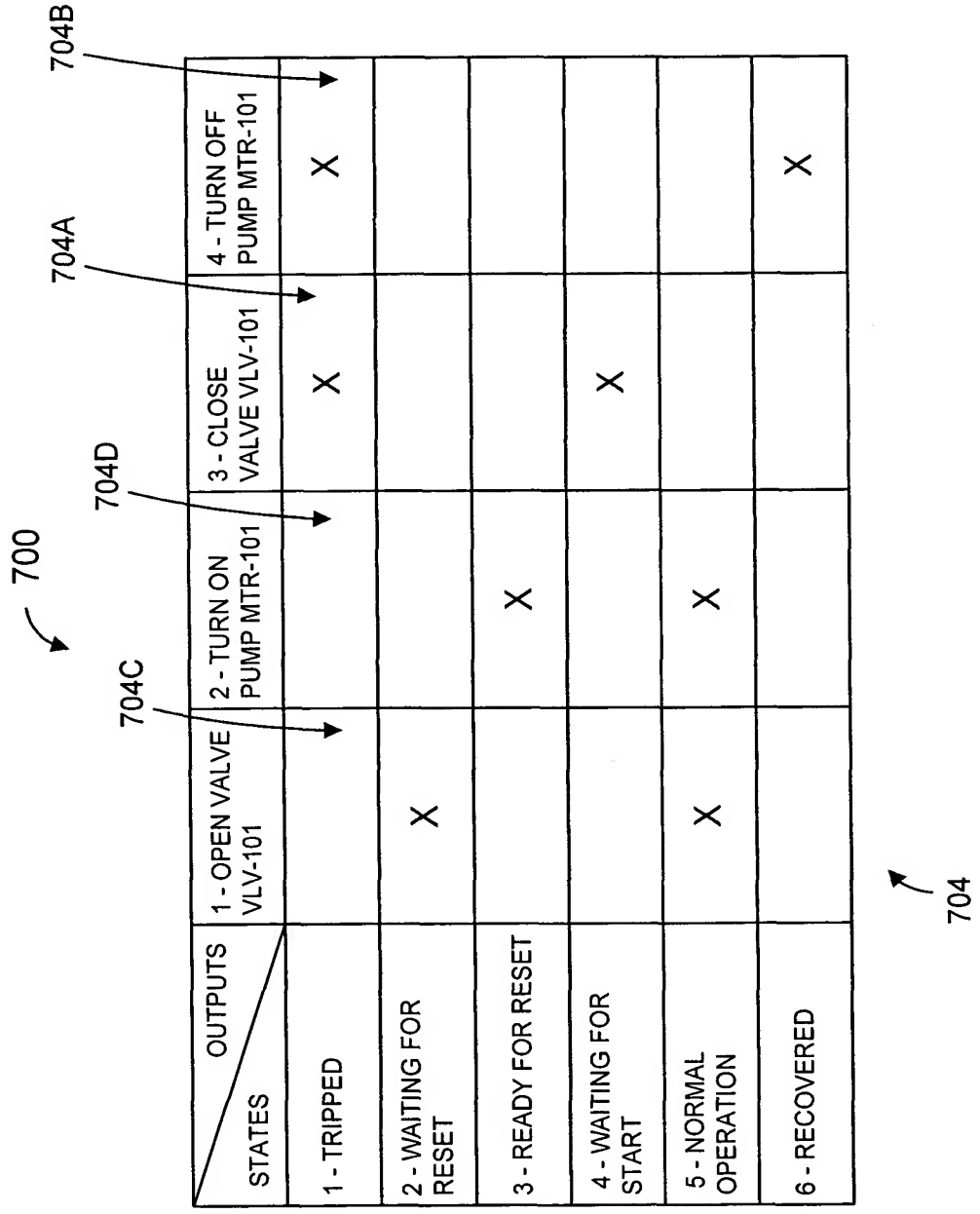
700
704
704A
704B
704C
704D
OUTPUTS
STATES
1 - OPEN VALVE VLV-101
2 - TURN ON PUMP MTR-101
3 - CLOSE VALVE VLV-101
4 - TURN OFF PUMP MTR-101
1 - TRIPPED
2 - WAITING FOR RESET
3 - READY FOR RESET
4 - WAITING FOR START
5 - NORMAL OPERATION
6 - RECOVERED
X

FIG. 13

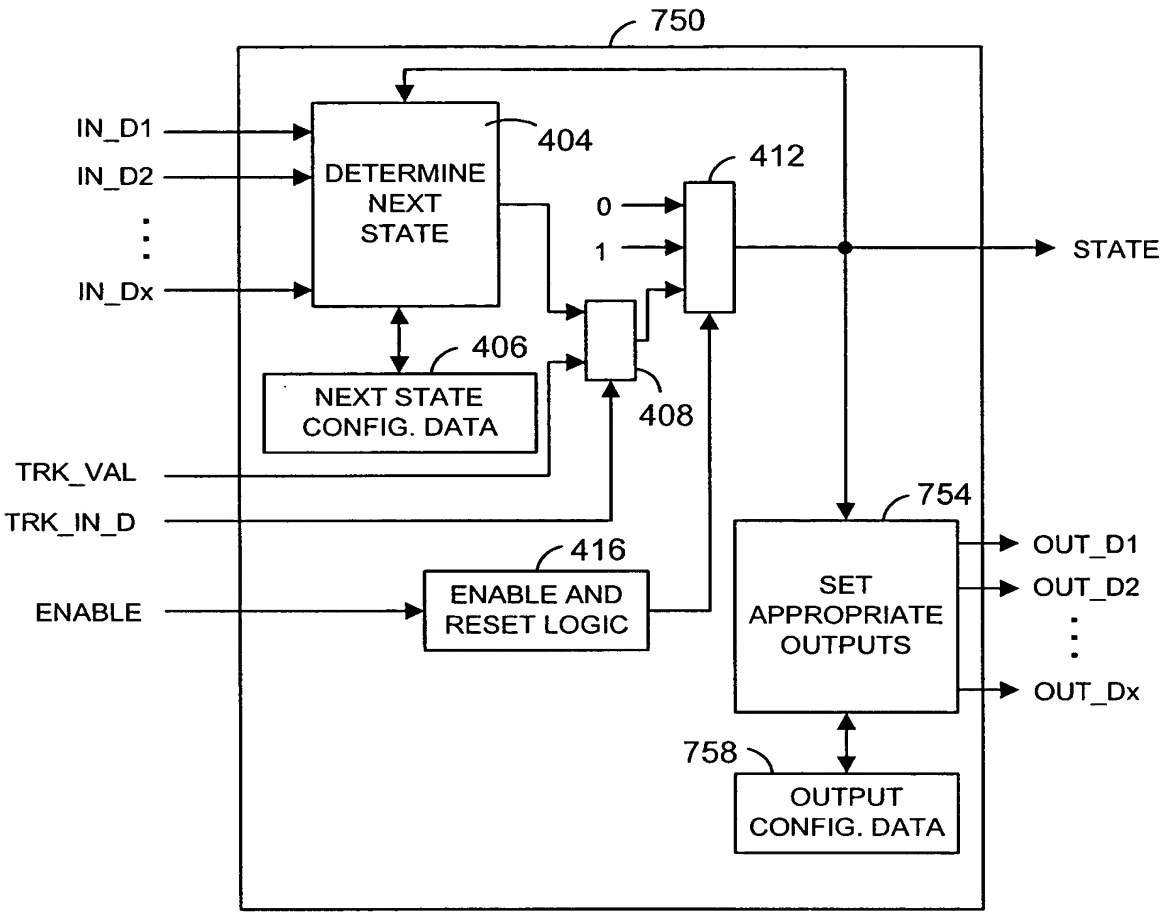
750
IN_D1
IN_D2
IN_Dx
DETERMINE NEXT STATE
404
412
0
1
STATE
406
NEXT STATE CONFIG. DATA
408
TRK_VAL
TRK_IN_D
754
416
ENABLE
ENABLE AND RESET LOGIC
SET APPROPRIATE OUTPUTS
OUT_D1
OUT_D2
OUT_Dx
758
OUTPUT CONFIG. DATA

FIG. 14

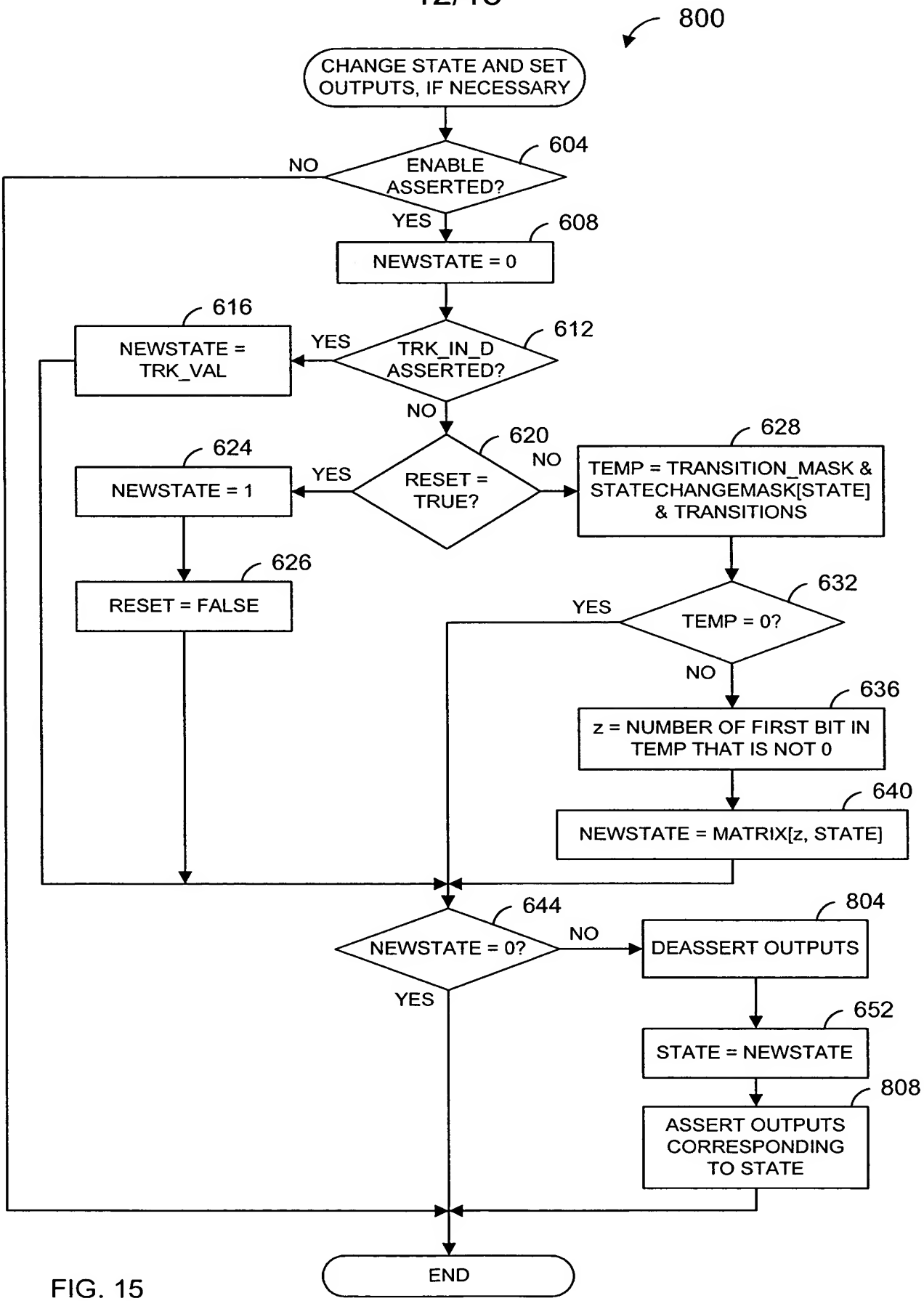
800
CHANGE STATE AND SET OUTPUTS, IF NECESSARY
604
ENABLE ASSERTED?
NO
YES
608
NEWSTATE = 0
616
NEWSTATE = TRK_VAL
YES
612
TRK_IN_D ASSERTED?
NO
624
NEWSTATE = 1
YES
620
RESET = TRUE?
NO
628
TEMP = TRANSITION_MASK & STATECHANGEMASK[STATE] & TRANSITIONS
626
RESET = FALSE
632
TEMP = 0?
YES
NO
636
z = NUMBER OF FIRST BIT IN TEMP THAT IS NOT 0
640
NEWSTATE = MATRIX[z, STATE]
644
NEWSTATE = 0?
NO
804
DEASSERT OUTPUTS
YES
652
STATE = NEWSTATE
808
ASSERT OUTPUTS CORRESPONDING TO STATE
END

FIG. 15

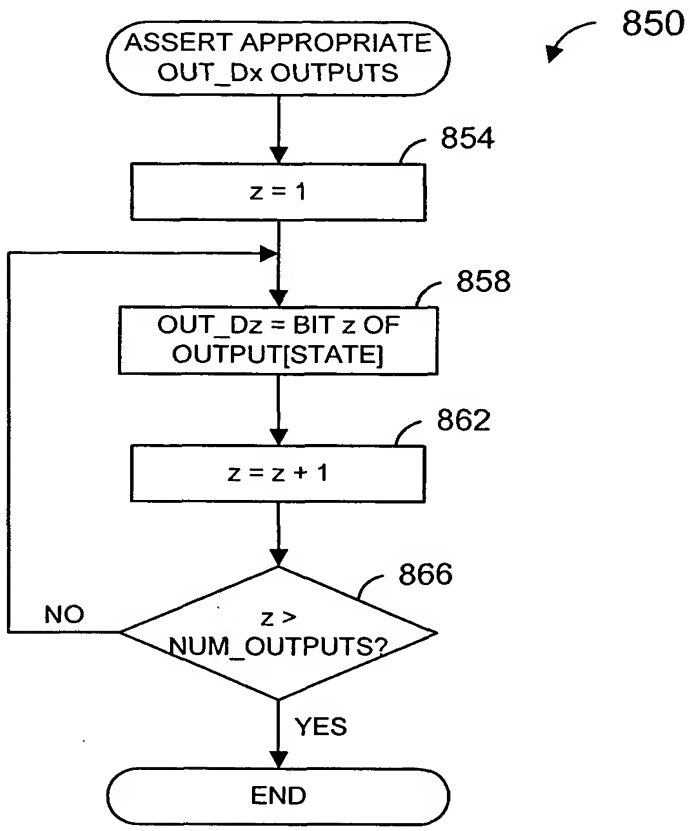
850
ASSERT APPROPRIATE OUT_Dx OUTPUTS
854
z = 1
858
OUT_Dz = BIT z OF OUTPUT[STATE]
862
z = z + 1
866
z > NUM_OUTPUTS?
NO
YES
END

FIG. 16

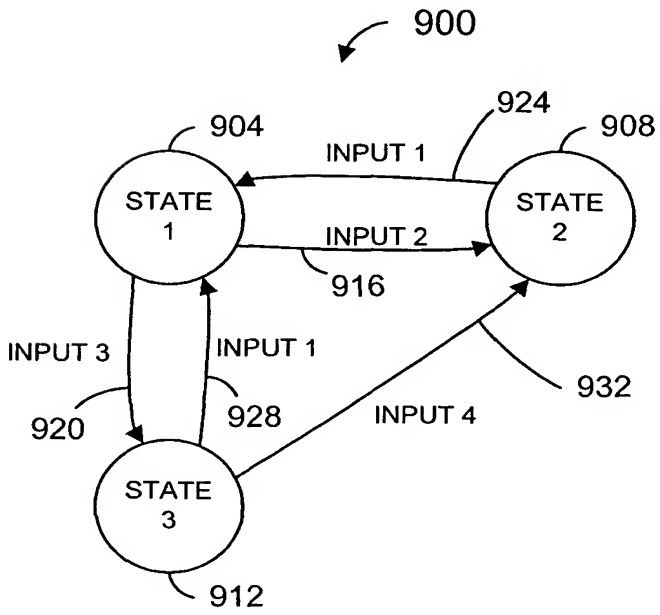
900
904
924
908
INPUT 1
STATE 1
STATE 2
INPUT 2
916
INPUT 3
INPUT 1
932
920
928
INPUT 4
STATE 3
912

FIG. 17